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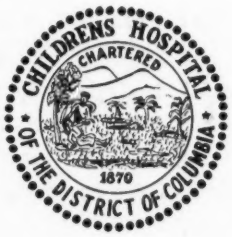

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ARACHNODACTYLY

Case Report No. 56

Dr. Clifford J. Tichenor Y. S. 40-5415

Y. S., a 10 year old colored female, was referred from school to the dispensary because of nervousness and urinary frequency of five days duration. It was related by the maternal parent that the child had some vague difficulty with her eyes since early childhood. There were no other outstanding complaints. The past history revealed that the infant had been full term, weighing 3060 grams and had had a good strong cry and well aerated lungs. There had been no feeding problems and the weight increment had been progressive. Cod liver oil and orange juice had been given in sufficient quantities since one month. The child walked freely at 14 months, talked at 18 months and had her initial dentition of lower central incisors at 7 months. Chickenpox had been contracted at the age of 2 and measles at the age of 5. There was no suggestion of previous dysuria, pyuria, polyuria or hematuria and no history of chorea or twitchings. The mother was living and well. There were two siblings, both well developed and well nourished. The paternal side was nebulous.

The physical examination revealed a pale, tall, thin, underweight colored girl, appearing about the stated age, having unusually long phalanges, metacarpel and metatarsal bones, giving the impression of abnormal length in her extremities, especially her fingers. The head was dolichocephalic with slight prognathism. The anterior fontanelle was closed. The external ears were of normal size and shape and the hearing was 15/15. Examination of the eyes under 2% homatropine revealed a definite ectopia lentis bilaterally with displacement upward and nasally homonymously. No pathology was noted in the fundi. The iris was tremulous and from the irregularity of the lens margins it seemed probable that the zonules were still intact, although stretched, so that these lenses would probably not become dislocated too easily. The visual acuity was 20/20 and the external ocular muscles were synergistic.

The palate was intact with a moderately high arch. The lips were thin. The spine showed a mild lateral scoliosis in the cervico-dorsal region. The musculature was rather flaccid but there was no curving of joints or hyperextensibility. The thorax had a peculiar deformation, the upper anterior portion being flattened, slightly pinched up and elevated toward the sternum.

The lungs were clear to percussion and auscultation. Examination of the heart demonstrated a long soft systolic murmur, heard best in the second

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left intercostal space in the parasternal line and not transmitted. There was no evidence of cardiac enlargement and the rate was 74, the rhythm slightly irregular. Blood pressure was 98/66.

The extremities were disproportionately long and the metacarpal lengths

FIG. 1. Y. S.: NOTE "SPIDER HANDS AND FEET", LENGTHENING OF THE LOWER ARMS AND LEGS

gave the impression of spider fingers. There was no evidence of genu valgum or pes planus. All reflexes were normal. The patient was alert, active and cooperative. Her mentality was considered slightly above average for her age.

Urinalysis and a complete blood count were normal. An electrocardiogram showed a moderate sinus arrhythmia, rate 60–75 and a P-R interval of 0.12. There was a normal axis with upright T waves in all leads, and well marked upright P waves. This was interpreted as a normal record. The Kahn test was negative.

Examination of the abdomen by means of a flat plate revealed nothing remarkable. Pyelographic examination by the intravenous method at the end of 4, 10, 20, and 30 minutes revealed the calices, pelves and ureters to be well outlined. There was a bifid pelvis on the left side but other than that there was no evidence of abnormality. This was believed to represent a negative intravenous pyelogram. X-ray examination of the hands, wrists and distal portions of the radii and ulnae revealed the metacarpals, carpals, and phalanges to be much longer than usually seen in a child of this age, but revealed no osteal or periosteal pathology. The sella turcica was considered roentgenologically normal.

The diagnosis was that of Arachnodactyly or Dolichostenomelia, potentially Marfan's syndrome with lens subluxation.

Discussion

Arachnodactyly is defined as a congenital syndrome characterized by "spider hands and feet," muscular atrophy and often ocular and cardiac anomalies. Marfan in 1896 first described this syndrome but the case reports of similar conditions have been sparse; R. W. Baer, Frederick, Maryland, states that to date, less than 100 cases of this rare syndrome have been recorded.

Theories on its etiology are numerous. It is thought to be a form of muscular dystrophy, closely related to amyotonia congenita and possibly on a congenital and familial basis. Others belive it is an endocrine disorder and still others that it is caused by a fault in the mesodermal cells of the embryo. Other theories include syphilis, mongolism and hyperchondroplasia.

In reviewing the literature one must conclude that nothing definite is known concerning the etiology. Baer states that about thirty percent of the reported cases are hereditary and familial.

The striking feature of this disease is the relative and absolute increase in the length of the metacarpal, metatarsal and phalangeal bones. Although some rarefaction is usually the case, the x-ray plates do not seem to show nearly as much thinning out and rarefaction of the hand and feet bones as one would expect from the clinical picture. The flaccid musculature and sparse subcutaneous fat seem responsible for the frail appearance.

Abnormalities of the skull are said to be present in eight percent of cases. Marked atrophy of the muscles, especially of the extremities, is usual, as are deformities of the external ear. Bilateral abnormalities of the eyes occur

in over fifty percent of recorded cases, subluxation of the lens being most frequently mentioned. Congenital heart disease is rather common and includes patent interventricular septum, patent ductus arteriosus and patent foramen ovale. There are also records of concomitant abnormalities of other viscera, especially the pulmonary tree and the genito-urinary tract.

Affected children are taller usually but weigh less, both relatively and absolutely, than normal children of the same age. The blood pressure and basal metabolism are low, but blood chemistry and urinalysis are normal. Usually the mentality is excellent.

In conclusion, a rare picture is presented here that can hardly be confused with any other syndrome.

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GENERALIZED VACCINIA

Case Report No. 57

Dr. Ralph Stiller C. G. 46-3463

C. G., a one year old white female, was admitted to Children's Hospital on May 2, 1946 with a chief complaint of "infected eczema." The eczema had been present since the age of 5 months. Various attempts at isolating the offending allergens had been unsuccessful and the child had been kept moderately sedated since the onset of the lesions. Two days prior to admission the lesions had become purulent. There was a history of "red" urine for a week preceeding admission. The family history revealed that the mother had allergic rhinitis and eczema. The review of systems was essentially negative.

Physical examination on admission revealed a one year old white female, irritable and feverish (103.6°). The right ear and pharynx were slightly injected. The chest was clear, heart not abnormal. The abdomen was soft and liver dullness extended 1½ fingers below the costal margin but the liver edge could not be felt. The whole body was covered with dry, scaly, eczematoid lesions. There was an area of cellulitis on the left cheek. Umbilicated pustules were scattered over the surface of the right arm. These pustules were quite numerous. There was a marked generalized lymphadenopathy.

Further questioning revealed that the febrile course coincided in onset with the appearance of the umbilicated pustules and that a sibling had been vaccinated several days before this onset. A diagnosis of generalized vaccinia was made. Laboratory work-up showed a white count of 8,400 with 60% neutrophiles. Hemoglobin was 10 grams and the urinalysis showed 5 mgms. of albumin, a few white blood cells and an occasional red blood cell.

Twenty-thousand units of penicillin were given intramuscularly every three hours for three days and boric acid compresses were applied locally. The temperature came down to normal within 24 hours and 5 days later the patient was discharged.

Discussion

Generalized vaccinia is a rare condition complicating vaccination in children with infantile eczema. It may also occur as a complication of any other skin disease that leaves a roughened excoriated surface. Specifically impetigo, intertrigo and secondary syphilis can be offenders in this regard. As is so graphically shown in the presented case this complica-

tion may also occur when the sensitive child is in contact with another individual who has just been vaccinated, the most casual contact with the virus of vaccinia producing the generalized lesion. At times the skin lesions of generalized vaccinia may be severe enough to resemble confluent smallpox and may carry a mortality as high as 33%. A similar lesion known as autovaccination may occur when a child who is vaccinated is permitted to scratch the resulting lesion and then reinnoculate himself elsewhere. This is rarely as severe as true generalized vaccinia and the secondary lesions resemble more the accelerated type of vaccinoid reaction.

It might be well to review the development of a primary vaccinia as the generalized disease is merely an extension of the single lesion to other parts of the body. On the third or fourth day post-innoculation a reddish papule appears at the site of innoculation which one day later becomes a small elevated vesicle. By the seventh day the vesicle is larger, umbilicated and surrounded by an area of swollen erythema. This likewise continues to enlarge and by the ninth day the entire lesion may be 10–12 cm. in diameter. The vesicle, purulent by this time, begins to dry up, forms a scab, which by the eighteenth day detaches leaving a punched-out scar. On a smaller and multiple scale this occurs in generalized vaccinia, although the lesions rarely leave a scar. The generalized malaise that accompanies his developing lesion is usually maximal by the sixth day at the time that the vesicle is enlarging and the areolar beginning to appear.

This case is presented to call attention to the care that must be taken in vaccinating children and to point out the necessity of knowing not only the condition of the patient but of other members of the family who might be affected by exposure to the vaccinia virus.

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PEANUT IN THE LUNG

Case Report No. 58

Dr. H. Glick D. F. 46-2671

D. F., a 2 year old white male, was admitted to the hospital on April 10, 1946 with the chief complaint of persistent cough and fever.

The original history revealed that the patient had had frequent choking

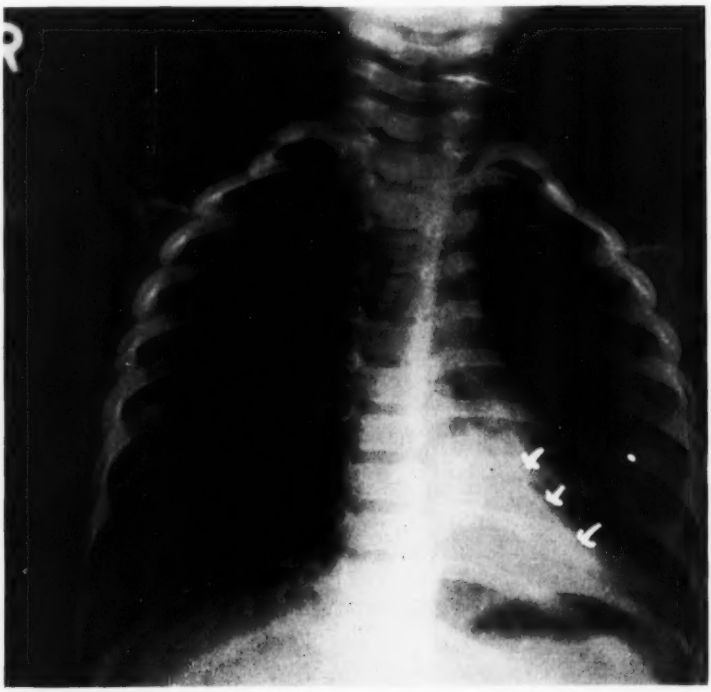

FIG. 1. D. F.: AP VIEW OF THE CHEST SHOWING THE COLLAPSED LEFT LOWER LOBE FOLLOWING ASPIRATION OF THE PEANUT

spells following paroxysmal coughing for about five weeks accompanied for the preceding five days by fever and anorexia. Further interrogation of the mother by the attending pediatrician revealed that "on Sunday, February 3, although I don't know that this might have to do with it, my son ate some peanuts and shortly after had a choking spell. The following day he

wheezed so much that I spent my whole day taking care of him. Since then he has coughed almost constantly and about March 31 he seemed to get a fresh cold and sore throat and a fever which at times was quite high."

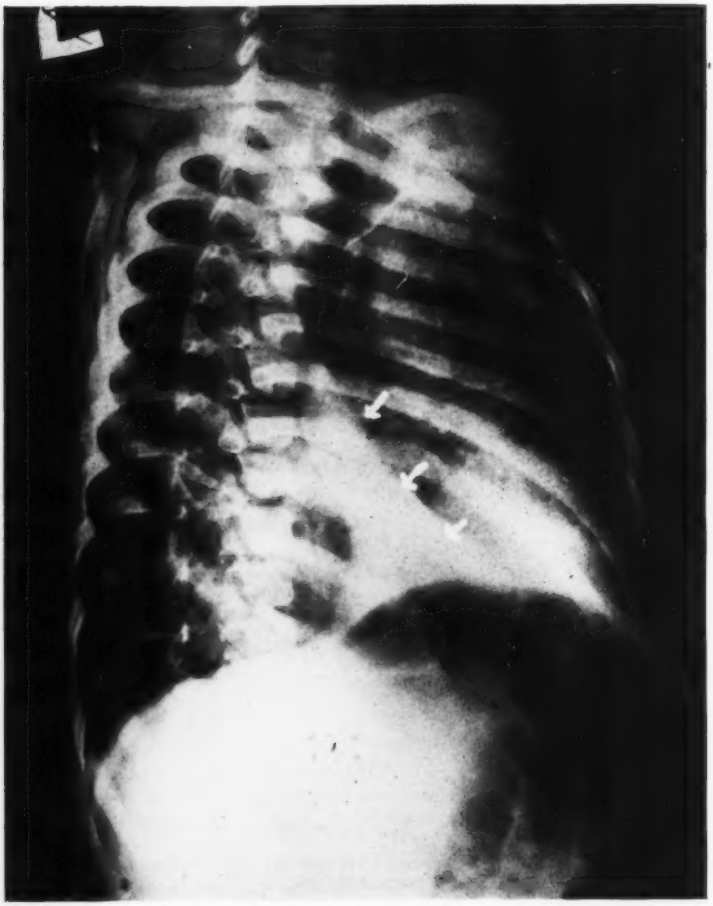

FIG. 2. D. F.: OBLIQUE VIEW SHOWING COLLAPSED LUNG

The child had been examined by various doctors prior to his admission to the hospital and was apparently treated for bronchitis. Physical examination upon admission revealed a mild injection of the tonsils and pharynx, the gag reflex produced a severe productive cough, there was

dullness on percussion, numerous fine and coarse rales and increased breath sounds over the left base posteriorly.

The impression upon admission was aspiration of a foreign body (peanut) with a possible pneumonic process in the left base.

The temperature upon admission was 103.8° and the laboratory work-up revealed the urinalysis to be normal and the blood count to show a moderate anemia and mild leukocytosis. X-rays of the chest revealed the presence of a collapsed left lower lobe with an inflammatory lesion in the lower half of the left lung.

He was given penicillin intramuscularly, 20,000 u. every 4 hours, and on April 13 was bronchoscoped. Broncoscopy revealed the presence of pus and disintegrated pieces of peanut in the left main stem bronchus which was aspirated. The patient showed immediate improvement and following this procedure the temperature gradually leveled off reaching the base line 6 days later.

The patient's coughing remained a constant feature throughout his stay in the hospital but his general condition was considerably improved. He was discharged on April 20 only to be re-admitted on the following day because of a recrudescence of high fever and severe cough. Physical examination upon re-admission was essentially negative except for moist, fine and coarse rales with dullness on percussion over the left lower chest posteriorly. The impression at this time was a resolving inflammatory process in the left lung and on the following day x-ray examination confirmed this opinion. Penicillin was again administered for 10 days with a disappearance of signs and symptoms. At the end of this period he was discharged symptom free except for a slight residual dry cough.

Discussion

Roy G. Klepser M.D.: The problems associated with the diagnosis and treatment of foreign bodies in the food and air passages are certainly not new ones, for children have probably always swallowed objects which failed to reach the stomach and aspirated objects into the lower respiratory tract. The impression is sometimes expressed that such occurrences are more frequent in recent years. This is probably a reflection of the greater incidence of diagnosis,—which in turn is proportionate to the degree of suspicion with which the pediatrician obtains the history in every case of sudden onset of cough or dyspnea. The x-ray diagnosis, based upon visualization of opaque bodies or atelectasis, which may be the sole sign of a nonopaque vegetal body in a bronchus, is usually diagnostic,—but the practitioner must first be aware of the possibility of there being a foreign body in the esophagus or respiratory tract so that he will obtain the x-rays.

Without endoscopy for the safe removal of such foreign objects, the

morbidity is very high. An example of this exists in a report made to the American Surgical Association by J. R. Weist in 1882.[1] In 599 cases in which there was clinical evidence of a foreign body in the respiratory tract or esophagus, the foreign body was not removed. There was a mortality of 139 cases, or 23.2%. In 338 other cases bronchotomy or tracheotomy was performed as a surgical means of removing the objects. There were 93 deaths (27.4%). The mortality rate in this series was better when the objects were not removed.

The advent of bronchoscopy and esophagoscopy with highly specialized instruments devised by Chevalier Jackson, created a new outlook. Coins, bones, open safety pins, screws, and vegetal foreign bodies can now easily and safely be removed under direct vision. The earlier blind methods of removal, so frequently the cause of mediastinal infections and death in the past, have no place in the modern treatment of foreign body therapy.

Although the value of skilled endoscopic removal of foreign bodies has become well established, the dangers of blind attempts at removal have not been as readily recognized. Many of the cases referred to the thoracic surgeon have already had attempts made at removal. Some of these attempts, although ineffective, are relatively harmless, such as attempting to make the patient eat bulky foods. Others, such as induced vomiting and blind bouginages used in an attempt to push the object downward into the stomach, are extremely dangerous, and should be widely condemned. The esophagus is often perforated by these methods, and fatal mediastinitis results unless immediate mediastinal drainage is done.

Of the vegetal bodies found in the bronchial tree, the peanut is the chief offender. Small children, even at five years of age, do not manage peanuts well, and the peanut has become the most frequent foreign body we have found in the respiratory tract. The length of stay in the bronchus varies from several hours to several months. The history is usually that of a sudden coughing attack while the child was eating peanuts, with dyspnea and wheezing following this. Many cases are diagnosed and treated as pneumonia until a history or x-ray obtained after drug therapy had failed to alter the clinical signs, suggested the possibility of a foreign body in a bronchus. Dyspnea is infrequent when the aspirated body is metallic, as a pin or a screw or nail, unless there has been previous instrumentation. In vegetal objects, dyspnea is frequent, as many of these subtsances such as the peanut set up a laryngo-tracheo-bronchitis. The edema in these cases is not always localized to the involved bronchus, but may be generalized, or may even be a subglottic edema which necessitates tracheotomy before removal of the foreign body is attempted[2].

Atelectasis is the common x-ray finding, and a subsequent bronchiectasis or lung abscess may be the ultimate result. Bronchiectasis is a serious

sequel to some of these cases even after the object is removed if the object has been present long enough to produce bronchial stenosis. Remarkable improvement following bronchoscopic removal of such objects may lead the patient and the physician to misinterpret this for complete recovery. Some of the children continue to run a low fever and exhibit signs of chronic pulmonary suppuration. Follow-up bronchoscopic examination with bronchographic studies should be done when there is evidence of continued suppuration, for the removal of the offending body, particularly if of long sojourn, is occasionally not adequate to insure complete recovery. A small number of such cases require subsequent lobectomy before recovery is complete.

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PENICILLIN SENSITIVITY

Case Report No. 59

Dr. Edward Sawan R. D. W. 45-1327

R. D. W., a 3 year old white male, was admitted to Children's Hospital on April 27, 1946 because of a rash and generalized pruritis of 48 hours duration. Seven days earlier the patient had had a high fever; at this time he was seen by a local physician who made a diagnosis of tonsillo-pharyngitis. Oral penicillin, 25,000 units per tablet, was administered, one tablet every 3 hours for a total of 12 tablets. The febrile reaction (102°) persisted for 5 days without appreciable change in the objective findings. Five days after the onset of the fever, the mother noticed a rash which appeared first on the extremities and spread centripitally to the body. Twenty-four hours after the onset of the rash the feet and fingers became uniformly edematous without color changes. This persisted until the day of admission. Pruritis was constant.

The past history was non-contributory. Careful questioning of the parents revealed that the child had never had a similar dermal reaction. No positive history of allergy or mycotic infection could be elicited.

Physical examination revealed a moderately inflamed pharynx accompanied by a mild degree of anterior cervical lymphadenopathy. The skin lesions were of two varieties: 1. large, irregular, sheet-like scarlatiniform areas on the torso; 2. annular, elevated, sharply demarcated, erythematous areas on the extremities. The dorsum of the hands and feet were edematous, taut, and tender. The impression on admission was angioneurotic edema with urticaria due to penicillin sensitivity.

The course in the hospital was uneventful. Temperature on admission was 102°, but dropped to a normal range within 4 hours and remained normal until discharge 48 hours later. Treatment consisted of adrenalin minims 3 intramuscularly, calamine lotion topically, and benadryl drams 1 every 4 hours for 3 doses. A penicillin intradermal skin test was negative. A hemogram and urinalysis were essentially normal. The patient was discharged two days after admission.

Case No. 2 T. W. 45-9982

T. W., a $3\frac{1}{2}$ year old white male, was admitted to Children's Hospital on April 10, 1946 because of fever and lassitude of one day's duration. The child had been perfectly well until the preceding day, at which time an elevation of temperature accompanied by a headache was noted. Three weeks prior to the present illness the patient had had rubella and had re-

ceived 2 injections of immune globulin by the family physician. The significant physical findings on examination were markedly enlarged, injected tonsils and grade 2 enlargement of the cervical lymph nodes. The remainder of the examination was essentially negative. The temperature upon admission was 102° and for the next three days a septic temperature course was noted with daily elevations, reaching 104.6° on the second day. Thirty thousand units of penicillin was administered intramuscularly every 3 hours, and he was given one penicillin lozenge orally (500 units per lozenge) every 3 hours. Two days after the penicillin had been started, a concomittant course of sulfadiazine was given consisting of $3\frac{1}{2}$ gr. every 3 hours for 7 days.

The temperature became normal and general improvement was quite noticeable on the 4th day. For the next 4 days the patient appeared quite well. On April 18 his temperature suddenly rose to 102.8° and a generalized, reddish-pink, macular rash appeared over the body. This rash shortly became typical blotches of giant urticaria involving nearly all the skin. There were many wheals with a blister-like appearance superimposed on many of the urticarial lesions. The skin was taut over the thighs and there was grade 3 edema of the hands, feet and periorbital regions. The temperature remained elevated for 24 hours, reaching 103.2°. The patient appeared most uncomfortable and irritated by the constant pruritis. Adrenalin, calamine lotion topically, and intravenous calcium gluconate afforded some relief, and 48 hours after the onset of the rash subsidence of the urticaria was noted. The child was discharged from the hospital before follow-up penicillin sensitivity tests could be administered.

Case No. 3 46-3126

P. R., a 4 year old white female was admitted to Children's Hospital on April 23, 1946 with the chief complaint of "eye trouble." Ten days previously the mother had noticed that the child's equilibrium was disturbed and she could not balance herself too well. She also noticed that the patient's eyes seemed sensitive to light. Thirty-six hours after admission the child developed bilateral facial swelling, the swelling appearing first on the left side. A diagnosis of epidemic parotitis was made. The left eye became quite red and swollen, and she continued to complain of the light hurting her eyes.

Past history: About a year ago the patient developed a painful blister below the left eye. The periorbital tissues were swollen and red and there was a slight febrile reaction. She was treated with sulfathiazole ointment topically following which the condition subsided. Ten days later the entire left eye again became swollen so severely that it could not be opened. The conjunctiva and sclera were quite injected, and fine blisters appeared on the

cornea. At this time there was no febrile reaction. The patient was hospitalized, and during her stay in the hospital the blisters were scraped off the cornea. For the next 5 months the blisters appeared repeatedly on the cornea and were scraped off monthly. In July, 1945 a conjunctival flap was performed. In August, 1945 the child received a course of penicillin. The eye infection subsided immediately except for a slight frosting of the cornea. Her course was uneventful until the present admission.

Physical examination on the present admission was essentially normal except for the pathology present in the left eye. There was a moderate ptosis of the left upper eyelid. The sclera of the left eye was steamy and congested; no follicles or blisters were seen on the initial examination. The conjunctiva of the left eye was deeply injected. Diagnosis on admission was conjunctivitis, Herpe's Zoster opthalmacus. The patient was seen by an opthalmologist who made a diagnosis of dendritic keratitis. Penicillin, 15,000 units every 3 hours intramuscularly, was administered. Ten days after admission the child developed circumscribed, slightly elevated, erythematous lesions on the body and extremities; the distribution of the lesions was non-uniform. There was an associated pruritis but no constitutional reaction was noted. It was felt at this time that we were dealing with an urticaria due to penicillin sensitivity. Penicillin was discontinued and within 36 hours the skin lesions disappeared. A blood count at this time showed no eosinophilia. An intradermal penicillin sensitivity test (1 c.c. equals 1,000 units) was negative. Further questioning again failed to elicit a family history of allergy. Other treatment during her stay in the hospital consisted of $\frac{1}{2}\%$ atrophine sulphate opthalmic ointment.

Discussion

In the 3 cases reviewed, which strongly suggest penicillin sensitivity, several findings in common to all were noted:

First: In all cases, the dermal reaction did not appear until at least 5 days after penicillin was first administered. The shortest period of anergy was 5 days, the longest 10 days.

Second: The dosage of penicillin given had no relation to the severity of the subsequent reaction.

Third: All three cases appeared within a 3 week period; as we had had no previous cases, the possibility of impurities in the penicillin used was considered. A pharmaceutical investigation has failed to substantiate this possibility.

Fourth: The penicillin intra-dermal test (0.1 c.c. in 1 c.c. equals 1000 u.) was negative in two cases after 24–48 hours.

Fifth: No history of allergy in the patient or family could be elicited; no history of mycotic infection was obtained.

Sixth: The reaction consisted of urticaria, severe pruritis, and a mild febrile reaction with other constitutional manifestations.

Seventh: Further breakdown of the cases showed that two cases had received penicillin therapy within the last 12 months without any reaction appearing. Furthermore, penicillin treatment was continued in one of the cases without aggravation of the urticaria which responded well to adrenalin and disappeared in 48–72 hours.

Eighth: Once penicillin was discontinued in the other cases the skin manifestations regressed within 48 hours to treatment with adrenalin, benadryl and calamine lotion topically.

It is difficult to compare our findings with those of Lt. Kolodny and Major Denhoff in their article in the April 20, 1946 issue of the J. A. M. A. since their series of 124 cases were in adults. It appears that the dermal reactions in our series were milder than in their series but were of the same type, i.e., urticarial.

In his series of 500 cases Keefer, et al., (J. A. M. A. 2, Aug. 28, 1943) reported the following toxic reactions: Fever 5; chills and fever 12; thrombophlebitis at site of infection 19; urticaria 14; and headache and flushing of the face 10. It will be noted that urticaria represented a high percent of reactions. This was also true in the report of Cormia, F. E., Jacobsen, L. Y. and Smith, E. L. (Reactions to Penicillin, Bull. U. S. Army, M.D., Dec. 1945). There was a higher incidence of reactions noted in those patients who had a history of mycosis.

In conclusion, we feel that in children the skin reactions are milder than those in adults; furthermore, protean manifestations are less common. The reactions are not a contraindication for continued use of the drug.

CLINICOPATHOLOGICAL CONFERENCE

Directed by: Dr. E. Clarence Rice
Assisted by: Dr. Robert B. Sullivan

Case Report No. 60

Dr. Robert B. Sullivan W. B. 46-1979

We are presenting the case of a nine months old white female who was brought to the hospital on the morning of March 18, 1946 because of a convulsion which had begun a short time before. She had been well except for a slight cold during the last ten days. There had been little coughing and there were few signs of an upper respiratory infection. On the night before the convulsion she had felt "feverish," had vomited twice, and had a few loose, watery stools. During the convulsion the eyes were rolled upward and there was stiffening and clonic movements of the extremities.

This infant had been born by a normal spontaneous delivery at term and had weighed eight pounds. She was bottle fed and received adequate cod liver oil and orange juice. There had been no inoculations and the only previous illness was pertussis at six months. There was no feeding difficulty or developmental retardation. She had had no unusual direct exposure to sunlight or other source of irradiation. This was the only child of healthy parents of English extraction.

Physical examination revealed a comatose, convulsing, moderately cyanotic infant with a temperature of 103.2°. There was a peculiar light tan-yellow generalized pigmentation of the skin of the same intensity of all surfaces and without any increase in intensity in the skin folds. The gums were colored a mottled pink and light brown. The anterior fontanelle was bulging and pulsating. There was no nuchal rigidity and the Kernig, Brudzinski, and Babinski signs were negative. A spinal tap obtained clear colorless fluid under increased pressure. There were two leucocytes per cubic millimeter, thirty milligrams of protein and less than ten milligrams of sugar. The ears and throat were without definite signs of inflammation. Direct throat smears were unsatisfactory and a throat culture grew only a non-hemolytic Staphylococcus aureus. Respirations were rapid and without sternal retraction. There were coarse râles in the trachea and bronchi. The lung fields were resonant and the breath sounds were harsh. Some dehydration was indicated by the hot and dry skin.

The red-cell count of the blood was 3.57 million with 14 grams of hemoglobin. The white-cell count was 17,500 with 56% segmented neutrophiles, 5% band forms, 37% lymphocytes and 2% monocytes. The red cells were morphologically normal.

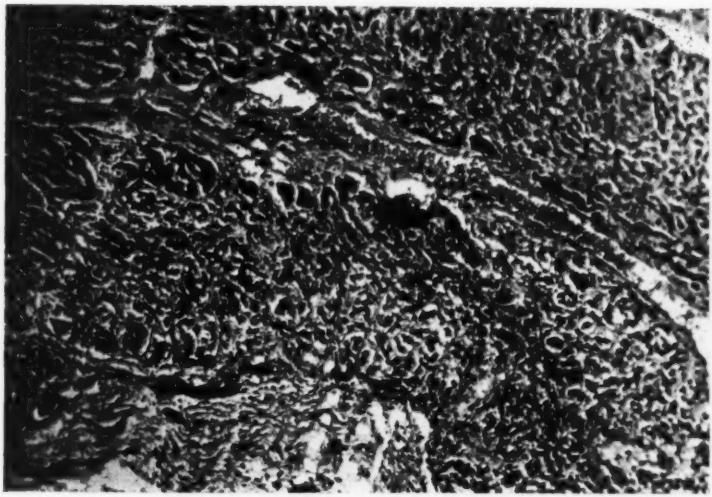

FIG. 1. W. B.: ADRENAL GLAND 150×. NOTE THICKNESS OF THE CORTEX AND DISRUPTION OF NORMAL ARCHITECTURE

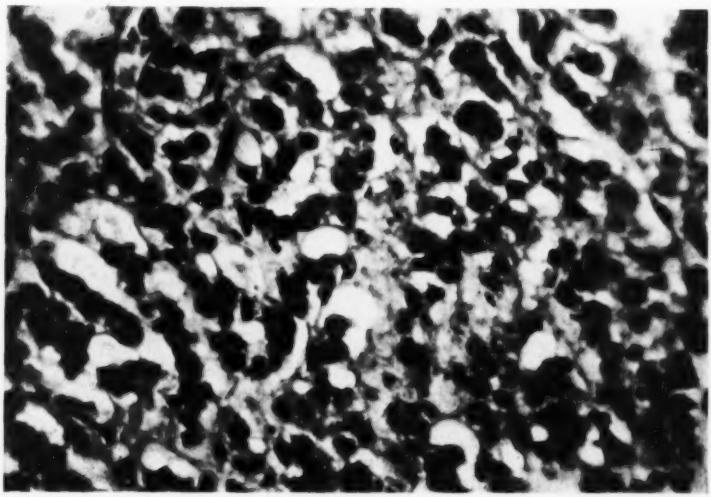

FIG. 2. W. B.: ADRENAL GLAND 676×. ZONA VESICULATA. NOTE THE LACK OF COLUMNAR ARRANGEMENT AND THE SPARSE CYTOPLASM

When admitted, the infant was given oxygen, penicillin 40,000 u. intramuscularly and 200 c.c. of one-sixth molar sodium lactate solution. Antipyretics and depressants were employed to stop the convulsion but were without effect. Five hours after admission a blood sugar estimation was 40 milligrams per cent. Two hundred cubic centimeters of 5% glucose were given intravenously and the convulsions stopped for one hour. Respirations and color remained poor and aspiration of mucus was necessary frequently. There were several copious watery green stools and a culture from them grew no pathogens. More intravenous glucose, avertin per rectum, and intramuscular calcium gluconate were administered and the convulsions entirely ceased twelve hours after admission. Cheyne-Stokes respirations and a rapid, thready pulse indicated a down hill course and the infant died seventeen hours after admission.

Differential Diagnosis

Dr. J. Chant Ju: The outstanding symptoms and signs of this case were: An acute onset of a convulsion preceded by an upper respiratory infection and a gastrointestinal disturbance accompanied by a high fever, cyanosis and dyspnea. There was generalized brownish pigmentation of the skin. Laboratory findings revealed a definite hypoglycemia, a moderately high leucocytosis with a relative increased percentage of polymorphonuclear forms and a high color index. Spinal fluid was clear and under pressure with a normal protein content and a very low sugar content. The convulsion was continuous and could be temporarily controlled by the administration of glucose and calcium. The disease was overwhelming and terminated with characteristic Cheyne-Stoke's respiration. The cause of death was most probably dehydration, acidosis, cerebral intoxication, following hypoglycemia. So that the differential diagnosis of this case might be safely limited to the field of diseases causing hypoglycemia with or without overwhelming infection or other acute conditions.

Clinically those diseases associated with acute overwhelming infection should be considered first because prompt control of the infection and measures combating low blood sugar and acidosis might be life saving.

Idiopathic hypoglycemia precipitated by a fulminating form of meningitis, pneumonia, or aspiration pneumonia might explain the course of this case as well as the laboratory findings. The pigmentation of the skin, however, remains unexplained. That might be an associated skin condition. According to Dr. Kennedy, the above mentioned diseases might cause hemorrhage into the adrenal cortex which would result in bronzing of the skin and also hypoglycemia.

Cases of hypoglycemia associated with intracranial hemorrhage resulting in acidosis and convulsions in infants are known. A history of a birth injury

would be significant. Xanthochromatic spinal fluid usually confirms the diagnosis.

Blood diseases of infancy with abnormal deposition of hemosiderin due to destruction of red cells associated with hypoglycemia would fit the described symptoms of this case. The absence of anemia could rule out most of them. Acute leukemia which would not necessarily have any change of blood picture and might run a fulminating course in infants, is a possible diagnosis. The pigmentation of the skin might be due to old subcutaneous hemorrhages. The high color index might be due to retardation of formation of the red cells without hemoglobin disturbance.

Nutritional deficiency and metabolic diseases which might cause secondary hypoglycemia should be mentioned. Cases of tetany and rickets which would cause a convulsion are not infrequent, but would not give such an abrupt termination.

The cardinal symptoms of pellagra are dermatitis, diarrhea, dementia, followed by death. This disease rarely occurs in infants under 2 years of age. A convulsion is rare. The pigmentation of the skin is rather characteristic and does not fit the description in this case.

In cases of diabetes mellitus, hypoglycemia might occur a few days after the onset. Convulsions, acidosis, and bronzing of the skin are sometimes found so it could be considered as one of the possible diagnoses.

Lead encephalitis precipitated by an infection is not uncommon in this age group. It would cause hypoglycemia secondary to glycosuria with leucocytosis and convulsions. But in the case under discussion the pigmentation of skin and gums was not characteristic of plumbism.

Under diseases causing primary hypoglycemia a neoplasm of the pancreas or congenital abnormality of the pancreas should be mentioned. Pigmentation of the skin would be absent.

Cortical insufficiency of the adrenal gland, Addison's disease in adults, which might be due to tumor growth, congenital abnormality, tuberculosis or syphilis, should be strongly suspected. Bronzing of the skin, vomiting and diarrhea are common. Convulsion followed by death shortly after the onset of the symptoms has been reported in infants and children.

Other diseases which are common causes of convulsions such as epilepsy, cerebral tumors, uremia and other intracranial complications, and diseases which are causes of skin pigmentation such as hemochromatosis, pernicious anemia, pancreatitis, and carotinemia, could be easily ruled out by the symptoms, laboratory findings and the course in this case.

My first impression would be that of cortical insufficiency of the adrenal gland percipitated by infection.

Secondarily, I would be in favor of idiopathic hypoglycemia associated with acute leukemia, or with acute overwhelming infection such as aspiration pneumonia or tuberculosis.

Lastly I would consider diabetes mellitus.

Clinical Diagnosis: Enteral diarrhea. Septicemia.

Dr. Ju's Diagnosis: Adrenal cortical insufficiency. Idiopathic hypoglycemia with acute leukemia? Idiopathic hypoglycemia with overwhelming infection? Diabetes mellitus?

Pathological Diagnosis: Hypoplasia of the adrenal glands.

Pathological Discussion

Dr. Sullivan: In addition to the rather marked light brown pigmentation of the skin and gums this patient showed a moderate cerebral edema without gross or microscopic evidence of inflammatory reaction. This change was probably a result of the convulsions. The thymus was the largest of those seen in the last two hundred autopsies. It weighed 34.9 grams and measured 8.0 by 7.0 centimeters but did not compress the contiguous structures. There were petechial hemorrhages in its substance. The right side of the heart was moderately dilated and the lungs and abdominal viscera were congested. The important lesion was found in the adrenals which together weighed but 2.9 grams. The cortical tissue was light gray in color and the medulla was represented by a thin red line. Two layers of the cortex and the medulla between them measured 2 mm. at the widest portion. Microscopically the cortex was narrowed and the normal architecture was distorted with the fasicular layer being particularly affected. The cytoplasm here was scanty and the columnar arrangement was lost. In some parts the medulla appeared normal, in others this portion of the gland seemed reduced in size. The process appeared to be representative of hypoplasia and was apparently not the result of an inflammatory process. The kidneys were macroscopically somewhat hypoplastic but microscopically the only pathological change was marked congestion.

Bacteriological study of the heart's blood, brain, larynx, spleen and bowel produced no evidence of an infectious process.

Relating the clinical findings and the course with the pathological findings justifies the diagnosis of adrenal cortical insufficiency or Addison's disease. In 1938 Atkinson reviewed forty cases of Addison's disease in children of fourteen years or younger. Twenty-five were boys and fifteen were girls. Only five of the children were under ten years of age. By far the most frequent etiologic agent was tuberculosis. Other changes described were hypoplasia, degeneration, cystic changes, atrophy and absence of one adrenal gland with atrophy of the other. Clinically the disease usually has an insidious onset with melanoderma being generally the first symptom. But gastro-intestinal symptoms may usher in the disease and diarrhea with fever is frequent in children accompanied by severe convul-

sions and sudden death. The progress of the disease is more rapid in children than in adults and although adrenal cortical extracts are of value, this disease in the young individual is almost invariably fatal.

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